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ABSTRACT

Field testing of the Length Unit of the Money, Measurement and Time Program was conducted with 23 elementary school classes of educable mentally handicapped (EMH) children. The 218 Ss were assigned to the experimental group, the Hawthorne group, or the control group. Two criterion referenced tests were administered to evaluate Ss' measuring skills and vocabulary. Testing demonstrated that the Length Unit increased the EMH child's knowledge of length skills and vocabulary. However, the increase was not significantly greater than that obtained by controls. Analyses of community location effects indicated that the unit was equally effective in the urban and suburban communities, and apparently of even greater effectiveness in the rural areas. Teachers expressed a preference for the unit over other instructional materials. (GW)

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SUMMATIVE EVALUATION OF THE MEASUREMENT OF LENGTH UNIT OF THE MONEY, MEASUREMENT AND TIME PROGRAM[1]

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RESEARCH AND DEVELOPMENT CENTER
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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

Summative Evaluation of the Measurement of Length Unit of the Money, Measurement and Time Program[1]

Patricia H. Kraus, Martha L. Thurlow, James E. Turnure, Arthur M. Taylor[2]

Over a decade ago, Cronbach (1963) defined "evaluation" as "the collection and use of information to make decisions about an educational program." Too often, instructional materials have been placed in the classroom without undergoing any type of evaluation, thus making school children perhaps the "largest simple group of unprotected consumers" (Cass, 1973). This situation must be remedied not just by evaluating published materials, but also by evaluating materials as they are being developed so that they can be revised before publication.

Scriven (1967) has distinguished between these two types of evaluation in his definitions of "formative" and "summative" evaluations. "Formative" evaluation is defined as the assessment of an instructional product during its development. Its goal is to identify ways in which the materials can be modified as they are being developed in order to optimize their effectiveness. "Summative" evaluation is defined as the assessment of the final (i.e., revised) instructional product. Its purpose is to verify the worth of the product in a field-test situation, where it is often compared to other products which attempt to accomplish similar goals.

Over the past two years, instructional materials produced by the University of Minnesota's Research, Development and Demonstration Center have been subjected to both formative and summative evaluations. These materials referred to as the Money, Measurement and Time Program, were designed for educable mentally retarded (EMR) children. As each

unit in the Program was being developed, it underwent an intensive formative evaluation process (cf., Krus, Thurlow, Turnure, Taylor, & Howe, 1974). Revisions of all units were made on the basis of the feedback from the formative evaluations. This was done in order to prepare the units for use in a large-scale field-test. The summative evaluation of the units occurred during this field-test.

The present paper is a description of the summative evaluation of the Measurement of Length Unit, one of the five units in the Money, Measurement and Time Program. Formative evaluation of the Unit took place over a period of nine months. During the process of formative evaluation, the Unit was revised in accordance with the results of several input sources in order to produce an effective instructional product for EMR children (cf., Thurlow, Krus, Howe, Taylor, & Turnure, 1974). The purpose of the summative evaluation of the Measurement of Length Unit was to test the effectiveness of the revised unit and its useability in the classroom when interactions between Project personnel and field-test participants were minimal.

The Money, Measurement and Time Program

The Money, Measurement and Time Program (Thurlow, Taylor, and Turnure, 1973) is an instructional program designed for young educationally handicapped learners. The Program includes five units: 1) Money, 2) Measurement of Length, 3) Measurement of Weight, 4) Time with the Clock, and 5) Time with the Calendar. Systematic instruction is provided in these areas, without requiring that the children have reading or computational skills. Further information about the specific

instructional units in the Program is available in the Teacher's Introduction to the Program (Thurlow, Taylor, and Turnure, 1973).

The Money, Measurement and Time Program was developed from basic learning strategies research, such as research on mental imagery and verbal elaboration. It represents one of the first attempts to translate these recently developed areas of experimental research into an instructional program for EMR children.

The general aims of the Money, Measurement and Time Program were to develop vocabulary and related skills, and furthermore, to enhance general language development and the development of effective learning strategies. Several specific goals of the Program included: 1) an improved understanding of the critical vocabulary, and thereby better understanding of the general area of instruction (money, measurement or time), 2) the development of beginning skills in the particular area of instruction, with an emphasis on the use of these skills in everyday situations, 3) an increase in general language; especially expressive communication and 4) the use of more efficient learning and memory strategies in other areas of instruction.

Measurement of Length Unit

The Measurement of Length Unit, like the other units in the Program, was developed jointly by educational practitioners and educational researchers. Its goal was to provide EMR children with an understanding of length and its measurment by developing both vocabulary and skills. Special stress was placed on the comparative terms related to length (e.g., long, longer, longest, etc.). A needs

assessment, conducted prior to the development of instruction, had revealed that materials available for teaching length concepts were geared primarily for children of normal intelligence (e.g., they assumed understanding of comparatives and units and worked on addition problems), or for children with entry level skills (e.g., reading and/or counting skills) exceeding those of most EMR children of elementary school age. Based upon the evident lack of appropriate materials, an instructional package consistent with a verbal elaboration-based approach found to be successful with EMR children (Taylor, Thurlow, and Turnure, 1974) was developed.

Initially, the Measurement of Length Unit was produced in a pilot-test form which was subjected to extensive formative evaluation and revision (Thurlow, Krus, Howe, Taylor and Turnure, 1974). The revised edition was employed in the field-test and subject to summative evaluation. It is the revised form which is described here.

The field-test version of the Measurement of Length Unit included three books of instruction. The first book presented the comparatives of distance, height, and length. Vocabulary and skills involved in measuring to the nearest foot were presented in the second book, and instruction on measuring to the nearest inch was presented in the third book. The instruction in the three books of the Measurement of Length Unit was written to stress the gradual and closely structured development of both length vocabulary and related measurement skills. The three books in the Unit represent progressive levels of instruction, from the lowest to the most advanced. Children may begin in the Unit at various points depending

on their beginning skills. A book of instruction might take from a couple of weeks to several months to complete, again depending on the ability of the children. Individually administered assessment instruments are provided for initial diagnostic placement and for determining final achievement.

The instructional materials in the Measurement of Length Unit included teacher's editions (three books), cassette tapes containing definitions and stories related to important length concepts, books of pictures for the children to follow as the tape was presented, and numerous worksheets and transparencies to complete the instruction. Each book is composed of lessons that contain instruction related to one or more vocabulary words. Each lesson is associated with specific purposes and behavioral objectives. The lessons within a book are carefully ordered, with behavioral objectives in one lesson being requisite for adequate performance in later lessons. A lesson, which usually requires several periods of instruction, includes three major components: 1) pre-activities which introduce the concepts or review the meaning of necessary prerequisite concepts; 2) tape presentation which develop the meaning of vocabulary words and the relations between words; and 3) post-activities which review and reinforce the concepts and relations established in the tape presentation.

The Summative Evaluation Plan

The field-test of the Measurement of Length Unit was carried out in conjunction with the field-test of the Measurement of Weight Unit. Unfortunately, the desired field-test plan, in which classes

would be allowed to spend at least one year, if necessary, progressing through the instruction in the Unit, could not be implemented due to budget and time restrictions. Thus, except for a few classes, instruction in the Measurement of Length Unit was stopped after three to four months so that the field-test of the Measurement of Weight Unit could be started in the same classes. In the few exceptional cases, classes continued with the Measurement of Length Unit instruction until the end of the year (i.e., a total instructional period of four to five months), without receiving instruction in any other unit. A similar plan was used to test the Money and Time with the Clock Units.

Method

Design

For the summative evaluation of the Measurement of Length Unit, a two factor design was employed. The major factor of interest was the instructional treatment factor. The three treatments in the present design were: 1) Experimental, 2) Hawthorne, and 3) Control.

The Experimental treatment group represented those classes receiving the Measurement of Length instructional program.

The Hawthorne treatment group consisted of classes receiving instruction in the Money Unit from the Money, Measurement and Time Program. The Hawthorne group was included in the design as one type of control. Gains on the Length tests by this group would represent changes in performance one could expect from the "novelty" of a new program in the classroom, interactions with testers, "learning to

learn," and several other related factors. To conclude that the Measurement of Length instruction itself contributed significantly to performance increases, one must discover that the Experimental group performed significantly better than the Hawthorne control group.

The Control treatment group represented those classes where teachers were left on their own, either to teach or not to teach length concepts. When these teachers chose to teach length, they were allowed to use any materials available to them (e.g., published materials, teacher-developed materials, etc.), but they were not allowed to use the Measurement of Length Unit from the Money, Measurement and Time Program.

The second factor in the design was that of community location (urban, rural, or suburban). The identification of communities as urban, rural, or suburban concurred with the categorization scheme of the Minnesota Department of Education. Urban communities included three of the four major cities in Minnesota. Suburban communities were ones which immediately adjoined these cities. Rural communities included those not covered by the above classification system. It should be noted that these "rural" communities were somewhat atypical. For instance, one contained two small colleges and another contained one. Also, academic and professional people lived in some of the "rural" communities and commuted daily to work in a nearby urban community.

Subjects

The population employed for field-testing during the summative

evaluation was elementary school-aged educable mentally retarded children. Of the 23 classes employed during the present field-test, eight classes (2 urban, 3 rural, and 3 suburban) were chosen to be in the Experimental treatment (i.e., they received instruction from the Measurement of Length Unit), eight classes (2 urban, 3 rural, and 3 suburban) were included in the Hawthorne control treatment (i.e., they received instruction in the Money Unit), and seven classes (2 urban, 2 rural, and 3 suburban) were included in the Control treatment (i.e., they received instruction from any source other than the Length Unit, if the teacher chose to give it to them). Assignment of the classes to treatments was made so the lower functioning classes would be in the Experimental group. This was done in order that some classes would enter the instruction at the beginning of the Unit, which was considered to provide instruction on especially low-level concepts.

Overall, there were 70 children (16 urban, 23 rural, and 31 suburban) in the Experimental group, 76 (18 urban, 31 rural, and 27 suburban) in the Hawthorne group, and 72 (18 urban, 23 rural, and 31 suburban) in the Control group. It should be noted, however, that the specific numbers of children for which data from the tests were available varied due to testing procedures (see below) and absenteeism.

A summary of the children's IQs, mental ages (MAs) and chronological ages (CAs) in the three treatment groups is presented in Table 1, along with the results of a one-way factorial analysis on each measure. Again, it should be noted that the number of subjects

Table 1

Comparisons Between the Three Treatment Groups on IQ, MA, and CA

	Experimental	Hawthorne	Control	F
IQ				
$\bar{X}$	68.7	72.3	74.8	7.51
SD	9.7	8.1	9.4	($p < .001$)
Range	47-85	47-89	56-93	
n	64	71	64	
MA(months)				
$\bar{X}$	69.6	77.1	78.3	6.32
SD	14.8	10.6	14.5	($p < .005$)
Range	40-108	47-105	55-118	
n	65	71	64	
CA(months)				
$\bar{X}$	99.3	106.5	104.0	2.70
SD	21.8	13.9	19.3	(ns)
Range	63-145	81-136	75-142	
n	69	71	70	

sometimes varies with the measure due to incomplete test data. Clearly, the three groups did differ significantly in IQ level and MA level. A Newman-Keuls test for difference between the IQ means indicated that the Control group had a significantly higher IQ than the Experimental group ($p < .01$) and that the Hawthorne group also had a significantly higher IQ than the Experimental group ($p < .05$). The Hawthorne and Control groups did not differ. A Newman-Keuls test on the MA means similarly revealed that both the Control ($p < .01$) and Hawthorne ($p < .05$) groups had higher MAs than the Experimental group. The Experimental and Hawthorne groups did not differ significantly.

Table 2 presents the IQ, MA, and CA data arranged according to community location. One-way factorial analyses revealed a significant effect of community location for each measure. Newman-Keuls test for differences indicated that children in both the rural and urban communities had significantly higher mean CAs and MAs than those in the suburban community (all $ps < .01$), with the rurals also signifcantly higher than the urbans in terms of MA level ($p < .01$). In terms of mean IQs, the suburban ($p < .01$) and the rural ($p < .05$) communities were higher than the urban community.

Tests

Two criterion-referenced tests were administered to the children to determine the effectiveness of the Measurement of Length instruction. Each test was administered as a pretest, and at the same time, to determine the placement of a class within the sequence of instruction.

Table 2

Comparisons Between the Three Community Locations on IQ, MA, and CA

	Urban	Rural	Suburban	F
IQ				
$\bar{X}$	68.4	71.7	74.1	5.59
SD	9.6	8.4	9.6	($p < .005$)
Range	47-85	49-88	47-93	
n	44	76	79	
MA(months)				
$\bar{X}$	75.8	81.4	68.8	18.74
SD	12.5	13.3	12.5	($p < .001$)
Range	50-103	40-118	41-105	
n	44	76	80	
CA(months)				
$\bar{X}$	111.2	112.6	90.7	47.99
SD	15.6	16.8	14.3	($p < .001$)
Range	78-144	78-145	63-121	
n	47	78	85	

The same tests were administered after Experimental group instruction in the Unit was stopped.

The Length Skills Test was a thirteen-item test designed to determine the child's functional understanding of the comparatives of length and his measuring skills. It consisted of three subtests which evaluated skills ranging from the comparatives to actual measurement. This test was administered to all children (except, of course, those who were absent, etc.).

The Length Expressive Test was a fourteen-item test designed primarily to evaluate the child's ability to utilize specific vocabulary words. It consisted of three subtests which corresponded to the three instructional books of the Measurement of Length Unit. This test was administered to only one-half of the children in each class in the present field-test. Administration was made randomly. The decision to reduce the data on this test was made in light of the excessive testing burdens put upon the teachers and children participating in the field-test.

A Cognitive Abilities Test (Thorndike, Hagen, and Lorge, 1968) was also administered to the children participating in the present field-test. Since this test was employed to evaluate the child's general improvement in non-content-specific areas of cognitive functioning after a full year of instruction in the Money, Measurement and Time Program, the results of this test will not be described here.

Procedure

The field-test of the Measurement of Length Unit was conducted

over a period of three to five months. The goal of this field-test was to assess the Unit under relatively "normal" classroom conditions, with minimal interaction between Project personnel and field-test participants.

Before instruction was started, children in each class were pre-tested on the Length Tests (Skills and Expressive) and the Cognitive Abilities Test. Then, each teacher in the Experimental treatment group attended a brief in-service training session designed to introduce the Money, Measurement and Time Program, the field-test plan, and specifically, the Measurement of Length Unit. Interactions with classes stopped at this point (except for "comment cards" returned to Project Directors when the teachers felt comments were necessary), until posttesting time.

After instruction ended, classes were posttested on the Length tests. (The Cognitive Abilities Test was administered at the end of the year.) At this point, Experimental teachers were requested to complete a detailed questionnaire on their reactions to the Unit, and to the Program in general. Control teachers were also asked to describe any instruction related to length that they had used during the same period.

Approximately two months after instruction in the Measurement of Length Unit had been stopped, a random sample of children who had received the instruction were retested on the Length Skills Test and the Length Expressive Test. The purpose of this retesting was to obtain a measure of content retention.

Results

The major sources of effectiveness data during the summative evaluation of the Measurement of Length Unit were the pretests and posttests. Because of absenteeism, testing procedures, school schedules, etc., only a limited number of the children participating in the field-test received both the pretest and posttests for the Measurement of Length Unit. In order to benefit from the larger number of children in the total sample, it was decided that all pretest data and all posttest data would be analyzed even though the results from the pretest would include some children not posttested, and vice-versa. These results are presented in two sections: 1) Pretest comparisons, and 2) Posttest comparisons.

The data from just those children receiving both the pretests and the posttests are presented next. The pretest to posttest comparisons on these data, although based on a reduced sample size, are probably the most reliable for assessing the effectiveness of the Measurement of Length Unit.

Data related to the performances of children in the three treatment groups on individual test items are presented next. These data not only provide further information on the effectiveness of the Unit, but also have the potential for identifying possible areas where revisions of the instruction should be considered.

The results section concludes with three additional sets of results. These results deal with: 1) Community location comparisons, 2) Retention findings, and 3) Feedback from teacher evaluations.

Table 3

Comparisons of Three Treatment Groups on

Length Skills and Length Expressive Pretests

Length Skills Test (11 items)

	Experimental	Hawthorne	Control	F
$\bar{X}$	4.29	5.22	5.48	3.78
SD	2.54	2.21	2.02	($p < .05$)
n	62	40	40	

Length Expressive Test (13 items)

	Experimental	Hawthorne	Control	F
$\bar{X}$	3.16	4.08	3.61	1.58
SD	2.59	1.93	2.03	(ns)
n	37	35	31	

Pretest Comparisons

In order to compare the posttest results of the three treatment groups (and so, assess the effectiveness of the Measurement of Length Unit), the pretest scores must first be compared to show that there were no differences between the three treatment groups on the Length tests before instruction. Table 3 presents the means and standard deviations of the pretest scores on the Length Skills and Length Expressive tests, and the results of a one-way analysis of variance for each test.

The results of the analysis of variance on the Length Skills Test indicated that there were significant differences between the three treatment groups. A Newman-Keuls test revealed that both the Hawthorne and Control groups scored higher than the Experimental group on this test (both $ps < .05$). These differences very likely reflect the lower IQ and MA levels of the Experimental group in the field-test. Of course, such differences will necessarily have to be considered when making the posttest comparisons on the skills test. No signficant differences were found between the three groups on the Length Expressive pretest.

Posttest Comparisons

The means and standard deviations of the posttest scores on the Length Skills Test and the Length Expressive Test are presented in Table 4, along with the results of one-way analyses of variance on each measure. A significant condition effect was not found on either measure.

Table 4

Comparisons of Three Treatment Groups on

Length Skills and Length Expressive Posttests

Length Skills Test (11 items)

	Experimental	Hawthorne	Control	F
$\bar{X}$	5.98	6.39	6.80	1.01
SD	2.78	2.40	2.41	(ns)
n	58	36	30	

Length Expressive Test (13 items)

	Experimental	Hawthorne	Control	F
$\bar{X}$	5.73	4.76	5.20	1.35
SD	3.04	2.56	2.37	(ns)
n	56	34	30	

Table 5

Pretest to Posttest Comparison of Subjects Receiving both Pre and Post Length Skills Test

	Experimental		Hawthorne		Control	
	Pre	Post	Pre	Post	Pre	Post
$\bar{X}$	4.54	6.27	5.15	5.89	5.50	6.75
SD	2.62	2.60	2.40	2.44	2.10	2.46
n	52	52	27	27	28	28
	$t = 6.40$		$t = 1.74$		$t = 3.56$	
	$(p < .005)$		$(p < .05)$		$(p < .005)$	

Two-way Repeated Measures ANOVA

Source of Variance	df	MS	F	
Between Ss	106	--	--	
Treatment	2	9.85	< 1	ns
Error	104	10.33	--	
Within Ss	107	--	--	
Tests (Pre, Post)	1	98.25	49.37	$p < .01$
Treat. X Test	2	4.46	2.24	ns
Error	104	1.99	--	

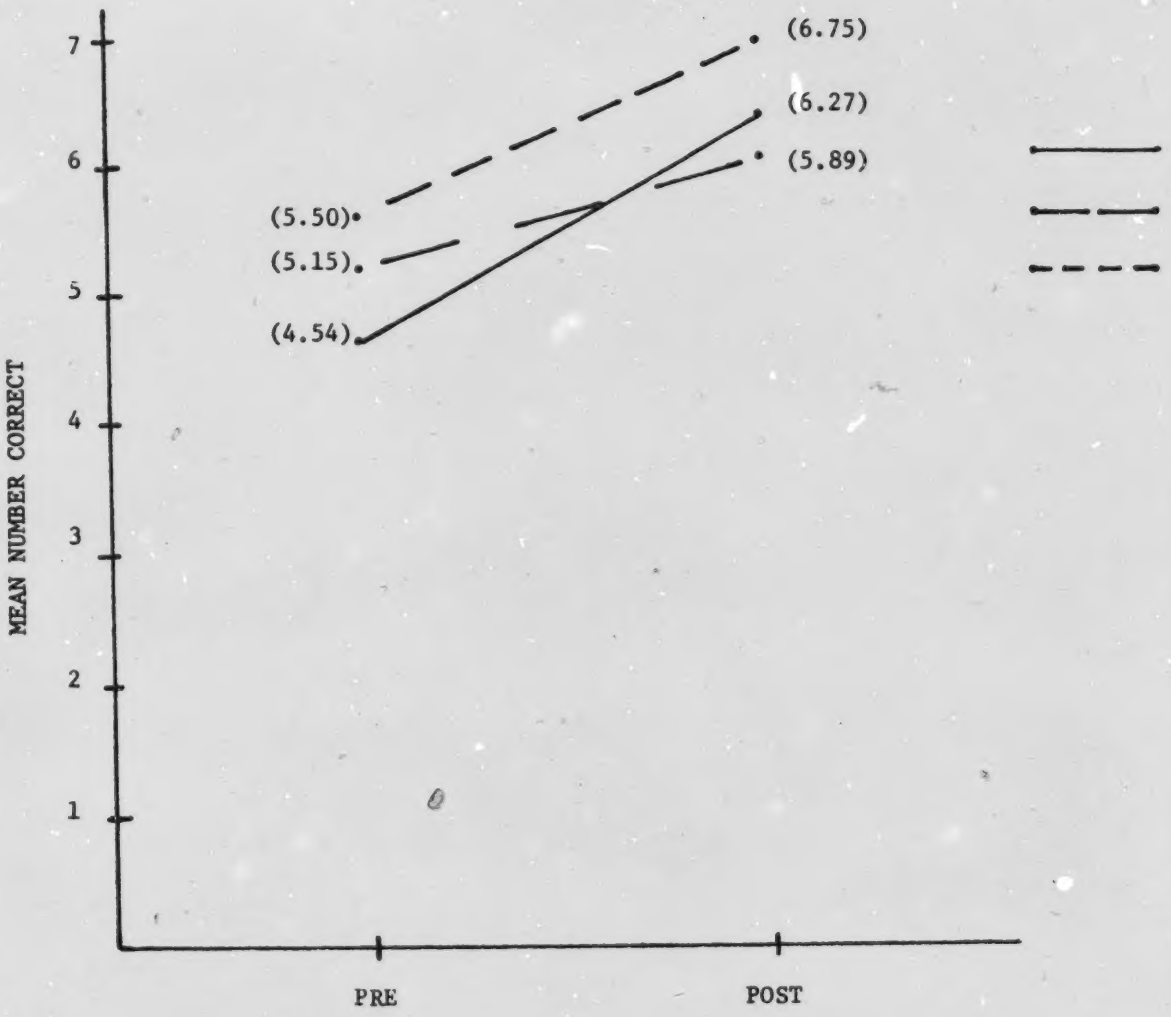
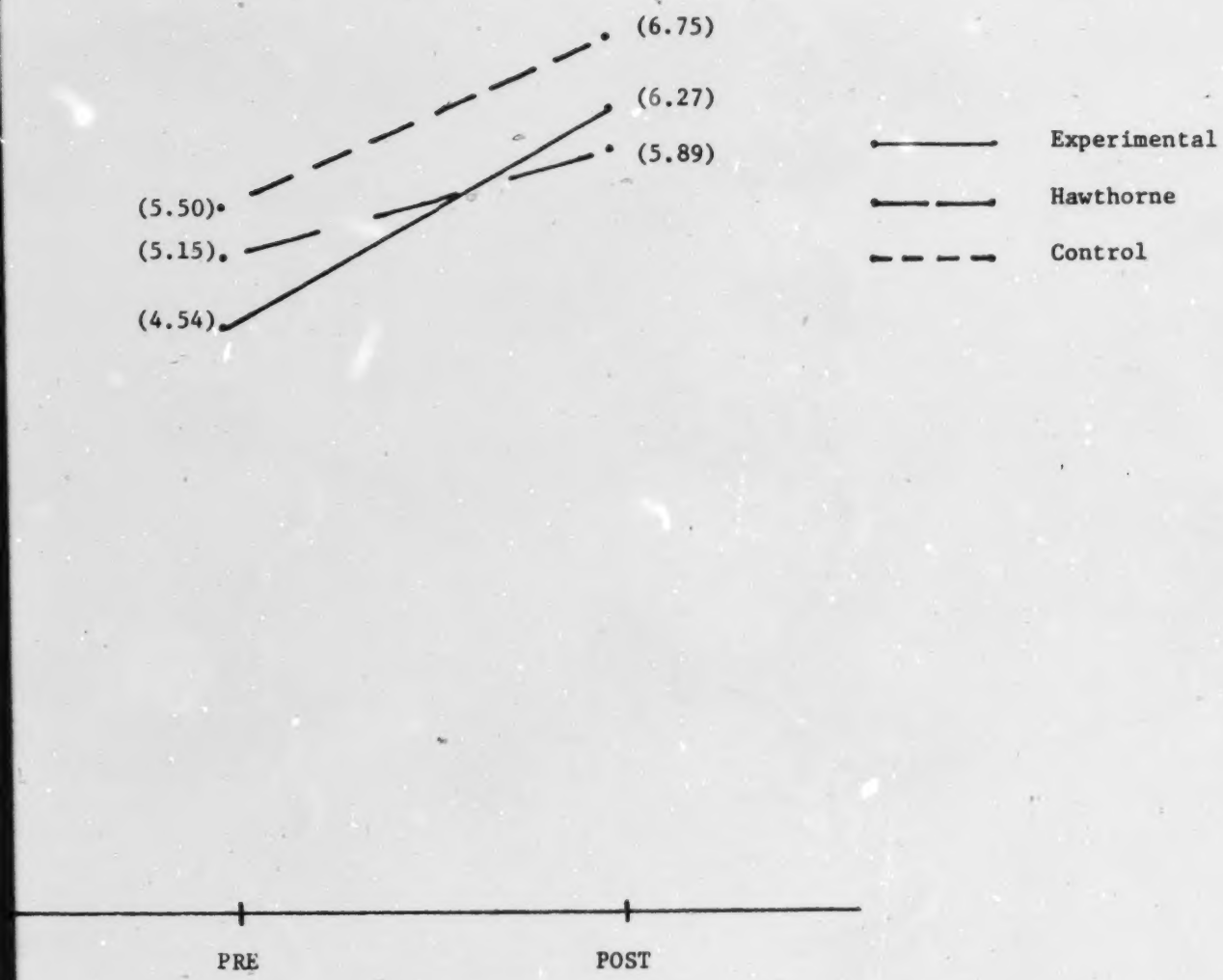


Figure 1. Mean Achievement Level on the Length Skills Pretest and Posttes
for each Treatment Group



igure 1. Mean Achievement Level on the Length Skills Pretest and Posttest for each Treatment Group

Pretest to Posttest Comparisons

The above separate analyses of pretest scores and posttest scores does not adjust for the fact that all children were not both pretested and posttested. In order to avoid some of the limitations of these analyses, the scores of just those children receiving both tests were analyzed. Table 5 presents the means and standard deviations for those children receiving both the Length Skills pretest and the Length Skills posttest. Table 6 presents similar data for the Length Expressive Test. As compared to the data in Table 3, there is a significant decrease in the number of children assessed. Consequently the pretest and posttest means and standard deviations are also somewhat different than those presented previously.

The data in Table 5 are presented graphically in Figure 1. Repeated measures *t* tests for each group indicated that all groups increased significantly from pretesting to posttesting. The increase was clearly largest for the Experimental group. A two-way repeated measures analysis of variance revealed significant differences between pretest and posttest scores on the Length Skills test. This analysis confirmed the conclusions drawn from the repeated measures *t* test.

Data related to pretest and posttest performance on the Length Expressive test are presented in Table 6 and Figure 2. Repeated measures *t* tests for each group indicated that only the Experimental and Control groups made significant changes from pretest to posttest. The Hawthorne group showed a small decrease from pretest to posttest. A two-way repeated measures analysis of variance on the same data revealed significant differences between pretests and posttests, and

Table 6

Pretest to Posttest Comparisons of Subjects Receiving both Pre and Post Length Expressive Test

	Experimental		Hawthorne		Control	
	Pre	Post	Pre	Post	Pre	Post
$\bar{X}$	3.45	6.39	4.92	4.83	3.78	5.43
SD	2.67	3.12	2.06	2.72	2.15	2.33
n	31	31	12	12	23	23
	$t = 7.12$		$t < 1$		$t = 3.38$	
	($p < .005$)		(ns)		($p < .005$)	

Two-way Repeated Measures ANOVA

Source of Variance	df	MS	F	
Between Ss	64	--	--	
Treatment	2	1.35	< 1	ns
Error	62	11.04	--	
Within Ss	65	--	--	
Tests (Pre, Post)	1	124.12	47.74	$p < .01$
Treat. X Test	2	20.44	7.86	$P < .01$
Error	62	2.60	--	

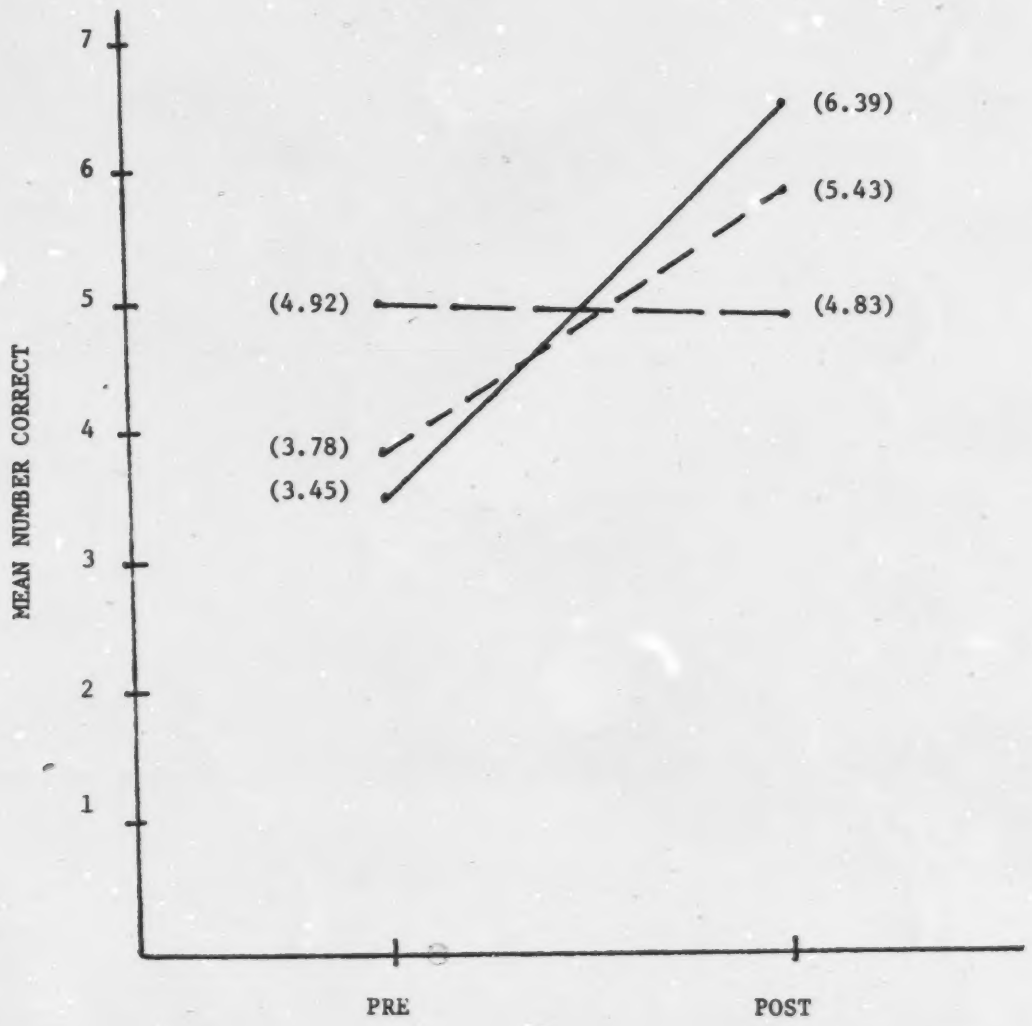


Figure 2. Mean Achievement Level on the Length Expressive Pretest and Pos

for each Treatment Group

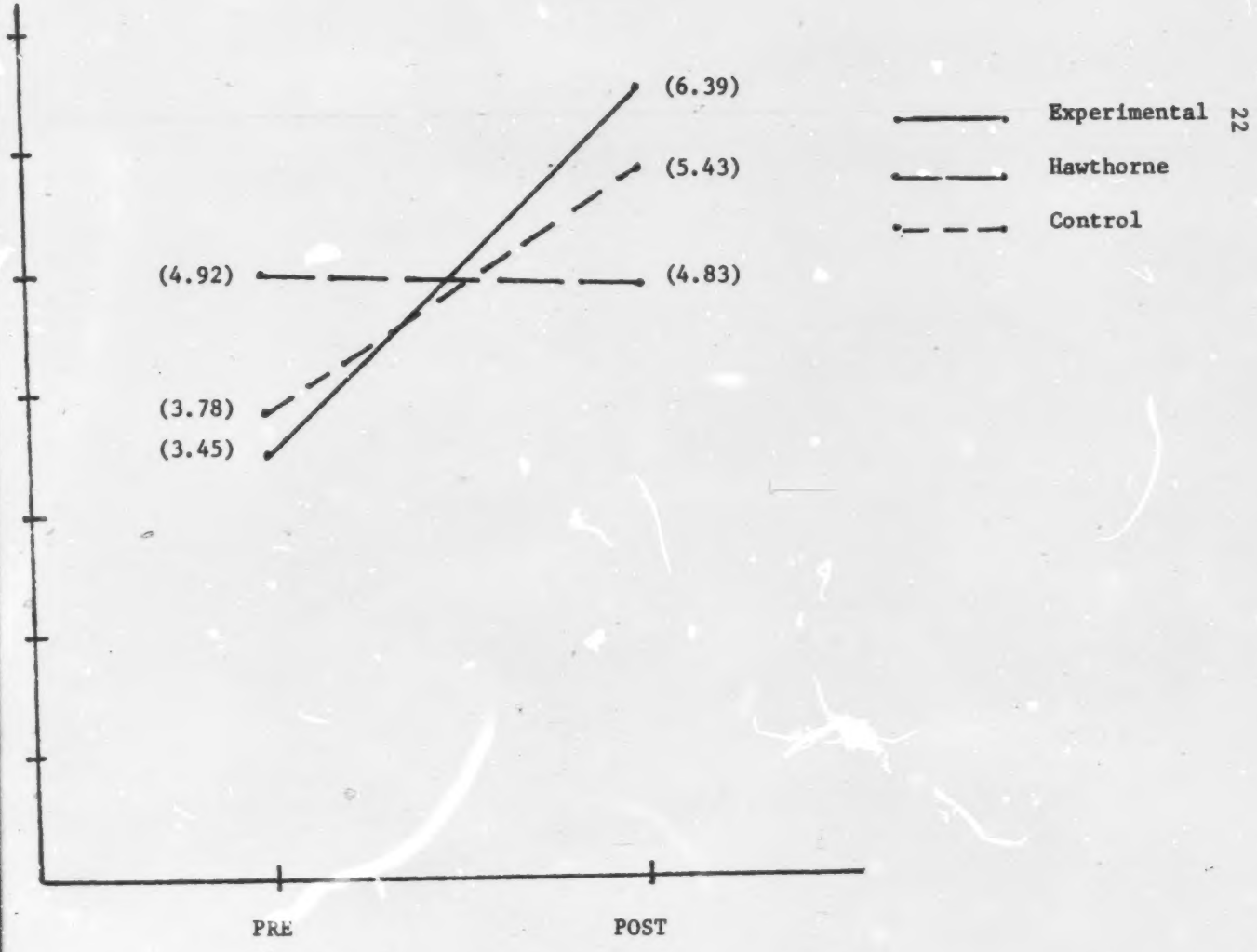


Figure 2. Mean Achievement Level on the Length Expressive Pretest and Posttest for each Treatment Group

a significant treatment by test interaction (see Table 6). Tests of simple effects on the interaction indicated that at the pretest, there was a significant difference between the treatment groups, with the Hawthorne group performing better than the other two groups ($p < .001$). Significant differences also existed at the posttest ($p < .001$), with the Experimentals performing better than the Controls, who in turn were performing better than the Hawthornes. The crucial tests between pretest and posttest performances for each group confirmed the finding of the repeated measures t tests: both the Experimental group [F (1,62) = 72.32, $p < .001$] and the Control groups [F (1,62) = 12.07, $p < .01$] showed a significant improvement from pretest to posttest (other $F < 1$). Observation of Figure 2, of course, further suggests that the improvement trend is most dramatic for the Experimental group on the Length Expressive test. From an initial position of the lowest status among the three groups, the Experimental group increased to the highest position.

Item Analyses

The Length Skills and Expressive tests were criterion-referenced tests, with items being directly related to the behavioral objectives of the instruction. Table 7 presents the pretest and posttest percent correct figures by test items for the Experimental treatment groups on the two Length tests. The experimental group has been subdivided into four groups which received differing amounts of Length instruction. In this table, the items from the two tests have been integrated and grouped according to where instruction related to both items appears in the Unit.

Table 7

Percent Experimentals Responding Correctly on Individual Items
by Where Instruction was Stopped

	Over-all		Bk 1 End		Bk 2 End		Bk 3 L2		Bk 3 End	
Beginning to Book 1, End	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Labels far	22	73	0	53	0	0	30	88	22	83
Identifies farthest	74	84	47	67	20	50	84	94	96	96
Identifies as close as	8	12	0	0	20	0	10	12	9	22
Identifies taller than	68	62	53	53	0	25	79	75	83	65
Labels tallest	32	62	0	33	33	0	30	75	53	78
Identifies longest	92	98	80	93	80	75	100	100	96	96
Demonstrates shorter than	52	55	13	33	40	50	58	81	74	91
Labels shorter	40	55	11	33	33	50	40	50	60	74
Orders shortest to longest	34	55	0	40	0	0	37	62	61	70
			ENDED INSTRUCTION							
Book 1, End to Book 2, End										
Labels measuring	59	73	33	40	33	100	60	87	80	83
Identifies measuring tools	50	76	20	67	40	50	47	100	74	70
Describes measuring tools	5	23	0	13	0	50	10	6	7	39
Demonstrates measurement of how far	32	53	13	20	20	0	32	88	48	61
Labels ruler	65	91	11	67	33	100	80	100	93	100
Labels foot	0	0	0	0	0	0	0	0	0	0
Measures feet	5	17	0	0	0	0	5	19	9	30
Labels longer than foot	27	61	11	13	0	50	30	88	40	74
Labels yard	5	18	11	0	0	0	0	12	7	35
					ENDED INSTRUCTION					
Book 2, End to Book 3, Lesson 2										
Demonstrates inch	14	33	0	7	0	0	21	38	22	52
Labels inches	30	54	0	20	0	0	30	44	53	87
Measures inches	18	40	0	0	0	0	26	38	26	74
							ENDED INSTRUCTION			
Book 3, Lesson 2 to End										
Labels length	11	30	0	0	0	0	0	44	27	43
Describes height	14	25	0	13	0	50	0	12	27	39
Measures feet and inches	3	16	0	0	0	50	0	0	7	35
									ENDED INSTRUCTION	

Observation of Table 7 indicates that for almost every item the Experimental subgroups showed marked increases from pretest to posttest when they had received the relevant instruction. For example, in the first grouping of items (which all subjects should have mastered) there was growth on every item except the one requiring that the children identify the concept "as close as." This was probably a very difficult item for EMR children, and more instruction may be indicated. However, groups which did proceed farther in the instruction showed increases on this item.

The instruction also seemed to provide the children with skills which enable them to correctly answer questions for which they have not received instruction. For instance, the children who received only Book One instruction were able to correctly answer many of the Book Two questions that they had missed on the pretest. With the other groups, there is a significant increase in almost all of the items from pretest to posttest. The Length Unit appears to have been efficacious when specific items are inspected.

Table 8 presents the same breakdown of test items as Table 7, but identifies the precentages of Experimental, Hawthorne, and Control subjects responding correctly to each item. In addition, for the Experimental group, it distinguishes between the percentages of those who received the instruction and those who did not. The Experimental subjects who received instruction did as well, and generally better, than the Hawthornes or Controls on most of the items. Experimentals who did not receive the Length instruction related to certain items tended to respond like the Hawthornes.

Table 8

Per Cent Responding Correctly in Each Treatment Group on Individual Items

	Experimentals Overall	Experimentals Receiving Instruction	Experimentals Not Receiving Instruction	Hawthorne	Control
Beginning ⟶ Bk 1, End					
Labels far	73	73	-	32	37
Identifies farthest	84	84	-	89	97
Identifies as close as	12	12	-	11	13
Identifies taller than	62	62	-	75	70
Labels tallest	62	62	-	65	57
Identifies longest	98	98	-	100	100
Demonstrates shorter than	55	55	-	81	90
Labels shorter	55	55	-	41	50
Orders shortest to longest	55	55	-	56	63
Bk 1, End ⟶ Bk 2, End					
		(N=41)	(N=15)		
Labels measuring	73	85	40	68	80
Identifies measuring tools	76	79	67	86	83
Describes measuring tools	23	27	13	26	43
Demonstrates measurement of how far	53	65	20	56	60
Labels ruler	91	100	67	94	83
Labels foot	0	0	0	0	03
Measures feet	17	23	0	8	17
Labels longer than foot	61	78	13	47	57
Labels yard	18	24	0	0	0
Bk 2, End ⟶ Bk 3, L 2					
		(N=39)	(N=17)		
Demonstrates inch	33	46	5	36	50
Labels inches	54	69	16	56	57
Measures inches	40	56	0	42	37
Bk 3, L 2 ⟶ End					
		(N=23)	(N=33)		
Labels length	30	43	21	29	17
Describes height	25	39	15	56	57
Measures feet & inches	16	35	3	12	17

Table 9

Comparisons of the Length Skills Posttest Data for the Three Community Locations in Each Treatment Group

	Urban	Rural	Suburban	F
Experimental				
$\bar{X}$	5.25	7.43	5.12	5.10
SD	2.49	2.62	2.64	($p < .01$)
n	12	21	25	
Hawthorne				
$\bar{X}$	6.67	6.33	6.25	< 1
SD	2.87	2.61	1.91	(ns)
n	9	15	12	
Control				
$\bar{X}$	7.50	7.89	5.87	2.54
SD	3.27	1.62	2.20	(ns)
n	6	9	15	

Table 10

Comparisons of the Length Expressive Posttest Data for the Three Community Locations in Each Treatment Group

	Urban	Rural	Suburban	F
Experimental				
$\bar{X}$	4.90	7.19	4.84	4.35
SD	1.85	3.02	3.04	($p < .025$)
n	10	21	25	
Hawthorne				
$\bar{X}$	3.14	4.86	5.54	< 1
SD	2.04	2.74	2.37	(ns)
n	7	14	13	
Control				
$\bar{X}$	6.67	5.89	4.20	3.32
SD	2.34	1.45	2.48	($p < .05$)
n	6	9	15	

Community Location Comparisons

During the formative evaluation stage, the Measurement of Length Unit was written by teachers who had taught in an urban community and was pilot-tested with urban children. To check the general effectiveness of the Measurement of Length Unit for other types of communities, comparisons of results by location were made.

Table 9 represents the Length Skills posttest performance data for the three treatment groups when further defined in terms of community location. Results of the one-way analysis carried out on each treatment group are also presented. Similar data for the Length Expressive Test are presented in Table 10.

Generally, the rural children scored higher than their suburban and urban peers. This difference was significant for the Experimental group on both the Length Skills Test and the Length Expressive Test. The difference between Controls on the Length Expressive test did not come out in a follow-up Newman-Keuls test. It is likely that the community location differences noted are related to placement practices in the communities, and very likely that the differences reflect the higher MA level of the rural children in the present sample.

Retention

One of the aims of the developers of the Measurement of Length Unit was to produce materials which would result in relatively "permanent" increases in the EMR child's ability to talk about length and actually measure length. To test for long term retention, the Length Skills and Expressive tests were readministered to the Experi-

Table 11

Length Skills and Expressive Test Scores for Experimental Subject at Posttesting and Two Months Later (Retention)

	Posttest	Retention
Length Skills Test (11 items)		
$\bar{X}$	5.98	6.95
SD	2.78	2.62
n	58	42
Length Expressive Test (13 items)		
$\bar{X}$	5.73	6.48
SD	3.04	3.25
n	56	42

mental subjects about two months after instruction in the Measurement of Length Unit had been stopped.

Forty-two children in the Experimental group were given a retention test. These children were from the five classes in which instruction in the Measurement of Length Unit was stopped. (The children in the three Experimental classes that continued instruction through the end of the year were not given the retention tests.)

Both the posttest and long term retention data are presented in Table 11. These data indicated that after two months, the Experimental children had not forgotten what they had learned about Length. In fact, their mean scores had actually increased, although the increases were not statistically significant. What is significant is the fact that the EMR youngsters, exposed to the Measurement of Length Unit for only two months, had increased their knowledge of length skills and vocabulary and had retained this knowledge for as long as two months.

Teacher Evaluation of the Length Unit

Six of the Experimental group teachers answered a questionnaire about the Length Unit. (See Appendix 1 for a copy of the questionnaire.) The number of years of teaching experience these teachers had varied from 2 to 32, with a mean of 10.2 years and a standard deviation of 11.6 years. The number of years teaching handicapped children ranged from 2 to 17 years ($\bar{X}$ = mean 6.0 years, SD = 5.7). All teachers were certified in special education.

On the evaluation forms, the teachers indicated that the mean preparation time for each teaching period was about 13 minutes. The average length of each teaching period was 19 minutes; and the Unit was generally taught every day of the week. The room arrangement preferred by most teachers was one where the teacher, tape recorder, and book were in the center, with the children on the floor around them.

All of the teachers enjoyed using the Measurement of Length Unit and would use it rather than another length instructional package when they teach length again. However, two-thirds of the teachers indicated that they would also use supplementary materials. Seventeen percent of the teachers indicated the Unit became "boring" to them due to repetition, but 66% of these also felt the repetitiveness was necessary. In general, at least half of the teachers thought the Length Unit was more useable, effective, and enjoyable than other commercial materials they had used. Half of the teachers felt that all of the concepts covered in the Length Unit were important to children in the long run, and the rest of the teachers reported that most of the concepts were necessary. All teachers felt the children would remember the more important length concepts a year from the time they learned them. They also reported that the materials were either "effective or "very effective." Half of the teachers thought the children were more interested in the instruction in the Measurement of Length Unit than they had been in other instruction.

The teachers did make some recommendations on their evaluation forms. While 83% thought that the Unit was complete as it is, 20%

requested more instruction at the end of the Unit dealing with measuring length. The teachers also requested that tests designed to measure the children's progress be inserted into the instruction at the end of key lessons or at the end of each book.

Other teacher reactions to the instruction and a summary of the data are available in Appendix 2.

Summary

The summative evaluation of the Measurement of Length Unit described in the present paper served to assess the effectiveness of the Unit for EMR children, and its useability in the classroom. The field-test of the Unit demonstrated that the Length Unit did increase the EMR child's knowledge of length skills and vocabulary. This increase was significantly greater than that obtained by a Hawthorne control group, especially on the Expressive measure (see Figure 2). The increase was also greater than that obtained by the Control group, but not significantly so.

The performance levels on individual items further supported the effectiveness of the instruction in the Measurement of Length Unit. When the data were analyzed in terms of whether or not instruction related to a specific item was received, the expected differences between the three treatment groups were generally observed (see Table 8).

Further support for the Measurement of Length Unit comes from the retention data collected about two months after instruction ended. These data indicated that the skills and vocabulary learned

from the Measurement of Length Unit were retained, and had even increased to some degree, after an interval of two months.

Analyses of community location effects indicated that the Unit was equally effective in the urban and suburban communities, and apparently of even greater effectiveness in the rural communities. This latter conclusion must be viewed as tentative, however, since there were confounding effects of MA level.

The useability of the Measurement of Length Unit for teachers was also documented as a result of the present summative evaluation. All of the teachers who used the Unit indicated that they liked it and would prefer using it to other instructional materials. Most of the teachers thought the materials offered more diversity than other materials, and were more useable, effective and enjoyable than other commercial materials they had used before.

The relatively high performance levels of the Control group indicate that the Control teachers were quite successful in teaching length concepts without a program designed specifically for their children. Five of the six Control teachers indicated that they had taught length concepts to their classes, with the time spent ranging from three days to "daily" throughout the year. Only two of the five teachers used published curriculum materials; all used materials they had developed themselves. The good performance of the children in the Control classes appears to reflect the success of their teachers in preparing effective materials to teach length concepts. It appears however, that the Measurement of Length Unit would be easier for teachers to use, especially for teachers who have not had time to

prepare their own materials, and yet would result in achievement which is as good, and generally better, than that resulting from other materials. The useability of the Length Unit is supported by the responses to the evaluation forms.

The Measurement of Length Unit presents length skills and vocabulary which have been identified as important to the normal development of any child, especially the young EMR child (cf., Kolstoe, 1970; Nuffeld, 1969; Peterson, 1973). The pretest data from the present field-test and from the formative evaluation of the Length Unit (cf., Thurlow, Krus, Howe, Taylor, & Turnure, 1974) indicated that these length concepts, while important for all children to learn, are particularly difficult for retarded children to master without instruction. The summative evaluation of the Measurement of Length Unit has demonstrated its effectiveness and useability in the classroom, and has verified the belief that the Unit fulfills a need in the education of the young EMR child.

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Footnotes

[1]The summative evaluation of the Measurement of Length Unit was an intensive endeavor which could not have succeeded without the help and cooperation of many individuals. Appreciation is extended to all school systems participating in the field-test, and especially to the teachers who used the materials. Special thanks are due to Joni Blumenfeld Troup who scheduled and completed all testing, and who formed the major link between the Project and the teachers in the field-test.

[2]Arthur M. Taylor is now Supervisor of Programs for the Mentally Retarded in the St. Paul Public School System. His address is: Special Education Department, MR Program, St. Paul, Minnesota 55103.

Appendix 1: Teacher Evaluation Form

MEASUREMENT OF LENGTH

Unit Evaluation

1. Where did you start teaching in the Length Unit? Book_____ Lesson_____

2. Where did you stop teaching in the Length Unit? Book_____ Lesson_____

3. Please indicate:
   a. The average preparation time for each teaching period: _____ minutes
   b. The average length of each teaching period: _____ minutes
   c. The average number of teaching periods per five day week: _____

4. Please indicate the percentage of time in which instruction was given to:

   Whole class_____%
   Small groups_____%
   Individuals_____%

---

1. How did you feel about using the Length Unit?
   _____ I enjoyed it very much
   _____ I thought it was alright
   _____ I would rather use something else next time

2. Have you used any other commercial materials or math texts to teach length concepts? _____ YES _____ NO
   If YES, what did you use?

   a. If given a choice of materials to use to teach length:
      _____ I would prefer to use this Length Unit rather than others
      _____ I would use either this Length Unit or other length materials; wouldn't matter
      _____ I would prefer to supplement this Length Unit with other materials
      _____ I would prefer to use other materials all together

   b. Compared to other commercial materials, was the Length Unit
      More useable? _____ YES _____ NO
      More effective? _____ YES _____ NO
      More enjoyable? _____ YES _____ NO

3. Did you get tired of teaching with these materials?
   _____ Yes, the repetiveness was boring
   _____ Sometimes, but the repetiveness is necessary to teach my students
   _____ No, these materials offer more diversity than most

4. How important do you think the concepts covered in the Length Unit are to the children in the long run?

_____ All concepts are essential
_____ Most concepts are necessary
_____ Concepts are good, but not necessary
_____ Most concepts are not needed

5. Do you think the children will remember the more important length concepts a year from now? _____ YES _____ NO

6. How effective were the materials:

_____ Very effective
_____ Effective
_____ Could have been more effective
_____ Not very effective at all

7. How interested were the children in the Length instruction?

_____ More interested than usual
_____ About as interested as in other instruction
_____ Not very interested

Please rate the following aspects of the Length Unit in terms of their appropriateness (or, completeness), for you as the teacher. Rate each item from 1 to 5, with 1 being the least appropriate (or, complete) and 5 being the most appropriate (or, complete).

	Appropriateness	Completeness
a. Inservice training		
b. Teacher's Editions, in general		
c. Introductory pages to Teacher's Editions		
d. Directions to teacher in lessons		
e. Pre-activities		
f. Lesson Organizers		
g. Scripts accompanying tape presentations		
h. Post-activities		
i. Worksheets		
j. Transparencies		

Please rate the following aspects of the Length Unit in terms of their effectiveness, enjoyability, interest, and attention-focusing ability, for the children in your classroom. Rate each item from 1 to 5, with 1 being the least effective (enjoyable, interesting, or attention-focusing) and 5 being the most effective (enjoyable, interesting, or attention-focusing).

	Effectiveness	Enjoyability	Interest	Attention-focusing
a. Introductory lesson (for preparation)				
b. Benjie				
c. Pre-activities				
d. Tape recordings				
e. Worksheets				
f. Transparencies				
g. Art work in books, worksheets, etc.				
h. Post-activities for review				
i. Post-activities to expand concepts				
j. Post-activities to build skills				

1. Did you have any problems with the pre-testing and/or post-testing of the unit? _____ YES _____ NO
   If YES, what were the problems?

2. Where did the pre-test results suggest that you start teaching the Length Unit? Book_____Lesson_____

3. Did you agree with the recommended starting point? _____ YES _____ NO

4. Did you teach all the lessons between the points at which you started and stopped instruction? _____ YES _____ NO
   If NO, what did you skip?

5. At what mental age would you recommend that children could start in the length Unit? _____

6. Are there any children for whom you feel the Length Unit is not appropriate?

7. How long do you think it would take your children to complete the entire Length Unit?

8. How long do you think it would take your children to cover the same content as presented in the Length Unit, without the use of the program?

9. Which of the following teacher-administered assessment devices would you like to see added to the Teacher's Editions to evaluate the children's progress?

_____ Lesson tests
_____ Book tests
_____ Unit tests
_____ None

---

1. Look at the sequence of the entire Length Unit. Is there any way you would change the sequence? _____ YES _____ NO
If YES, how?

2. How do you feel about the completeness of the Length Unit?

_____ Needs more instruction at the beginning
_____ Needs more instruction at the end
_____ Unit is complete as it is

Frequently, when a new program of instruction is introduced into a classroom, other individuals see and react to the materials. Please rate the reactions of any of the following individuals to the Length materials, on a scale of 1 to 5 (1 = negative reaction; 5 = positive reaction).

_____ Principal
_____ Parents
_____ Regular classroom teachers
_____ Aides
_____ Others

Please indicate:

a. Number of years of teaching experience (include all teaching except student teaching) _____
b. Number of years teaching educationally handicapped children _____
c. Are you certified in special education? ____ YES ____ NO

If you have the time and the inclination, are there any suggestions about the testing or the materials you would like to share with us?

Is there anything else you would like to tell us?

Appendix 2: Teacher Evaluations of the Measurement of Length Unit

A. Teacher Characteristics

1. Number of years of teaching experience (all except student teaching):

   $\bar{X}$ = 10.2 years
   SD = 11.61
   Range: 2-33

2. Number of years teaching educationally handicapped children:

   $\bar{X}$ = 6.0 years
   SD = 5.69
   Range: 2-17

3. All six teachers are certified in special education.

B. Teaching Characteristics

1. Average preparation time for each teaching period. (based on 5 responses)

   $\bar{X}$ = 12.6 minutes
   SD = 5.13
   Range: 5-18 minutes

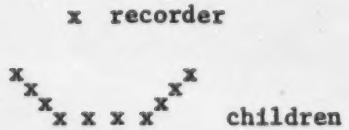
2. Average length of each teaching period.

   $\bar{X}$ = 18.7 minutes
   SD = 2.04
   Range: 15-20 minutes

3. Average number of teaching periods per five day week.

   $\bar{X}$ = 4.2
   SD = .88
   Range: 3-5

4. Room arrangements (based on 2 responses)
   a. "Children in desks with tape player in front of room."
   b. "Children on floor or on chairs around tape recorder."



   c. Neither of these two teachers felt any other room arrangement would be more appropriate.

C. General Reactions to the Length Unit

1. Item: "How did you feel about using the Length Unit?"

83%	"I enjoyed it very much"
17%	"I thought it was all right"
0%	"I would rather use something else next time"

2. Item: "Did you get tired of teaching with these materials?"

17%	"Yes, the repetiveness was boring"
66%	"Sometimes, but the repetiveness is necessary to teach my students"
17%	"No, these materials offer more diversity than most"

3. Item: "How important do you think the concepts covered in the Length Unit are to the children in the long run?"

50%	"All concepts are essential"
50%	"Most concepts are necessary"
0%	"Concepts are good, but not necessary"
0%	"Most concepts are not needed"

NOTE: One teacher commented that some concepts were too advanced and thus confusing and unimportant for her age group.

4. Item: "Do you think the children will remember the more important Length concepts a year from now?"

100% Yes ____ No

NOTE: One teacher felt that it depends on the individual child.

5. Item: "How effective were the materials?"

17%	"Very effective"
83%	"Effective"
0%	"Could have been more effective"
0%	"Not very effective at all"

6. Item: "How interested were the children in the Length Instruction?"

50%	"More interested than usual"
50%	"About as interested as in other instruction"
0%	"Not very interested"

D. Answers to Specific Questions

1. When asked to name other materials the teachers had used to teach Length, the following were noted:

   Milton Bradley flannel board objects and instructor curriculum materials
   One teacher noted she used other materials, but mentioned no names
   Four teachers indicated they did not use any other commercial materials to teach length concepts

   When asked if given a choice of materials to use to teach Length, the following reactions were given:

33%	"I would prefer to use the Length Unit than others"
0%	"I would use this Length Unit or other length materials; wouldn't matter"
66%	"I would prefer to supplement this Length Unit with other materials"
0%	"I would prefer to use other materials all together"

   When asked to compare the Length Unit to other commercial materials they had used, the Length Unit was noted as:

More usuable?	83%	Yes	17%	No
More effective?	50%	Yes	17%	No
More enjoyable?	50%	Yes	17%	No

   NOTE: Two teachers commented that these units were more complete than others.

   Two teachers only marked one of the above three concepts.

2. Item: "At what mental age would you recommend that children could start the Length Unit?"

   $\bar{X}$ = 6 years old
   SD = 1.26
   Range = 5-8

3. Item: "How do you feel about the completeness of the money unit?"

0%	"Needs more instruction at the beginning"
17%	"Needs more instruction at the end"
83%	"Unit is complete as it is"

4. Item: "Look at the sequence of the entire Length Unit. Is there any way you would change the sequence?" (Five responses)

   0% Yes 100% No

5. When asked to note the reactions of other individuals to the Length Materials, the following were given: (rating is on scale of 1-5)

4	Principal (N=2)
4	Parents (N=2)
5	Regular classroom teachers (N=2)
4.3	Aides (N=3)
0	Others (N=0)

6. Item: "Which of the following teacher-administered devices would you like to see added to the Teacher's Edition to evaluate the children's progress?"

33%	Lesson tests
0%	Book tests
17%	Unit tests
50%	none

7. Item: "Are there any children for whom you feel the Length Unit is not appropriate?"

   Responses:

   "Book 3 for most of my kids, was too hard"
   "No" (two teachers said this)
   "Yes, a hyperactive child who could not sit and listen in a group - all work has to be one to one"
   "Yes" (one teacher said "yes" but did not explain)
   "Yes, I feel my regular math program suffered because it was robbed of 15 minutes each day and many in my class would have grasped the concepts in your program in less time if given a little maturity or a higher mental age."

8. Item: (a) "How long do you think it would take your children to complete the entire Length Unit? (b) How long do you think it would take your children to cover the same content as presented in the Length Unit, without the use of the program?"

a	b (N=5)
school year or longer	same
4 months	full year
Book 2 - even had trouble here	NR
5 1/2 months	at least a whole school year
16 weeks	16 weeks (not as thorough)
1 year	?

E. Teacher Reactions to Specific Aspects of Length Unit (mean rating on scale of 1 to 5, from negative to positive; the number in parentheses is the N)

	Appropriateness	Completeness	Average
1. In-service training	3.4 (4)	2.8 (5)	2.6
2. Teacher's Edition, general	4.6 (5)	5.0 (6)	4.4
3. Introductory pages	4.6 (5)	4.5 (6)	4.1
4. Directions to teacher in lessons	4.6 (5)	5.0 (6)	4.4
5. Pre-Activities	4.7 (6)	4.8 (5)	4.2
6. Lesson Organizer	4.4 (5)	4.7 (6)	2.5
7. Scripts for tapes	4.3 (6)	4.4 (5)	4.2
8. Post-Activities	4.8 (6)	4.8 (5)	4.2
9. Worksheets	4.2 (6)	4.4 (5)	2.9
10. Transparencies	4.4 (5)	4.5 (4)	4.0

NOTE: One teacher would have liked to have had more worksheets and transparencies. Another commented that some scripts where "really bad."

F. Children Reactions to Specific Aspects of Length Unit (mean rating by teacher on scale of 1 to 5, from negative to positive, the N is 6 unless otherwise noted in parentheses)

	Effectiveness	Enjoyability	Interest	Attention Focusing	Average
1. Introductory Lessons	4.0	4.2	4.2	4.0	4.1
2. Benjie	4.5	4.8	4.8	4.8	4.8
3. Pre-Activities	4.7	4.2	4.2	4.2	4.1
4. Tapes	4.3	4.5	4.5	4.3	4.3
5. Transparencies	3.8 (5)	3.6 (5)	4.2 (5)	4.2 (5)	3.5
6. Worksheets	3.7	3.7	3.5	3.3	3.7 (5)
7. Art Work	3.5	3.3	2.8	3.3	3.3
8. Post Acts: Review	4.3	4.2	4.2	4.2	4.2
9. Post Acts: Expand	3.7	4.2	4.2	4.2	4.1
10. Post Acts: Skills	3.7	4.2	4.2	4.2	4.2

G. Specific Questions about Materials in general (asked of two teachers only)

1. Item: "Did you like using the Big Picture Book?"

One teacher said yes and the other one said they were ok. She felt the pictures could be bigger and better and that the comparatives should be very distinct. Also, she said hard bound covers would be easier to handle.

"Did you like the children to have their own texts?"

50% Yes 50% No

2. Item: "How do you think the student texts should be supplied to the classroom?"

50% "Only in the form of Big Picture Books"
0% "Only in the form of individual Children's Picture Books"
50% "In both forms, with both being used during the same tape presentation"
0% "In both forms, with the teacher selecting the form to be used during a given tape presentation"
0% "In one form for certain books and the other form for other books"(i.e., as it is now)

3. Item: "What do you think would be the most effective and useful way to inform the teacher of the content of the tape presentations?"

100% Complete script (as it is)
0% Summary of script
0% No script at all

4. Item: "Do you think the Money, Measurement and Time Program should be modified into a program of individualized instruction?"

"No"
"For my own needs - no, but I can see where it would be beneficial."

5. Item: "What do you feel would be the best way to introduce a unit in the Money, Measurement and Time Program to a teacher planning to use it in the classroom?"

0% In-service training
100% Written document, unit flow, books, etc.
0% Both in-service training and written document.

H. Teacher Comments (ones not specifically elicited by questionnaire)

1. "The guide was 'too wordy' for me. It got to be a bit of a burden to read so much. I felt I needed to do this now. However, if I used it again, it would be familiar. The guide is good for an inexperienced teacher."
2. "As I said before, Book 3 is just too difficult for my children, they couldn't get the terms."
3. "I would have liked to teach measurement through the metric system since the metric system is what the children will use in life."
4. "I think the teacher administered tests would be much better. I feel a rapport must be developed between the child and tester to get the best results. The testers didn't explain enough. The testers were always rushing. They treated the test more importantly than the children. I felt there wasn't understanding of or for the children. I feel the information gained is not too valid because of this situation."
5. "The children in my classroom would look forward to Benjie Time. Their favorite time was when Benjie talked to them on the tape recorder."

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University of Minnesota Research, Development and Demonstration
Center in Education o. Handicapped Children

(Place of publication shown in parentheses where applicable)

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